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ABSTRACT

Designed to address the varied computer skill levels of college students, this proposed computer literacy course would be modular in format, with modules tailored to address various levels of expertise and permit individualized instruction. An introductory module would present both the history and future of computers and computing, followed by an overview of computer hardware, software, and basic concepts and phrases. Students would then be introduced to basic MS-DOS commands, and a closing module would raise issues related to the ethics of computer use, privacy, and the social impact of computers. Other basic modules would introduce students to text processing, spreadsheet and database management, programming languages, and further information on MS-DOS or other operating systems. Advanced modules would be developed as needed. Instruction would be delivered in a variety of ways, including lecture, instructional videotapes, interactive disks, use of a projector tied to a PC, or completely individualized work combined with recitation classes. In order to facilitate the development of such a program, a structure within the institution should be established which includes an advisory committee to plan and implement the program, and a core of faculty, staff and students with computer expertise to develop the program. (EW)

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A Model Computer Literacy Course

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1. THE PROBLEM

The use of computer technology is changing modern education, and it is becoming increasingly necessary for ALL students to have actual experience using computers. There is great need for the educational community to advance quickly in computer expertise, especially those institutions which have become involved only recently in the use of computers in the classroom. Certainly, the possibility for computer proficiency and familiarity on some basic and common level is desirable for all students. Certainly, instructors of courses which use the computer would like to avoid the need to run computer orientations for each class, each semester -- such orientations can be redundant for some students, too difficult for others, may delay the covering of class material, and can frustrate instructors to the point where they stop using computers. And certainly, the computer-phobic among students, faculty and staff, who often act as roadblocks to advancing the use of technology, should be reached and educated.

2. A SOLUTION

One way to address the lack of computer proficiency would be through the curriculum. Students (and this includes faculty and staff) could be given familiarity with the capabilities of the computer, a command of the common vocabulary of computer use, and knowledge of certain basic techniques involved in the use of computer technology, all against a broad background of familiarity with the machines, software, and their uses, against which to continue learning. Further, students could be made aware of the social, ethical, and spiritual issues involved, and the impact computers have had in all areas of modern life. And lastly, students should be able to use the software appropriate to their discipline of study. The ideal goal would be for the student to become a self-reliant user, comfortable with the technology and familiar with its uses, and able to use manuals and other resources in adapting to technological changes.

Since the student population is likely to change as the use of technology becomes more widespread, the means of delivering appropriate education must be flexible and adaptable, and capable of easily adding new technologies as they arise. It should be

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student-directed, within limits, since student respond more favorably under such conditions.

2.1. METHOD

As a framework for providing the possibility for computer literacy, a flexible SERVICE course could be established, designed primarily to address the needs of students, but on which all members of the university or college community could be encouraged to draw. This course should be modular in format, for maximum flexibility and adaptability, and could feature a combination of lecture, recitation, and use of machine aids, as necessary. The modules within the course framework could be tailored to address various levels of expertise. Within the course framework, individual pathways could be determined by the student, and individually administered proficiency testing could be used to determine expertise. There could also be the possibility for students to 'place out' by passing a proficiency test, thereby earning credit for the module.

2.1.1 The Lowest Level

Since incoming students have not yet declared majors, and have a great need for basic and common knowledge, they will choose from beginning-level modules. There would be no need for particular departments to teach particular modules, since the modules are not content-specific, but rather focus on techniques; for example, English, physics, business faculty could all teach database manipulation, using various strategies when presenting the information.

2.1.1.1 The Introductory Module

There will be an INTRODUCTORY module, to be taken by all students who register for the course. During this module, students will be given an introduction to the history of computing and computers, followed by speculations about the future of technology. This would be followed by an overview of hardware: parts of the computer, kinds of printers and storage media, etc. Much of the confusion experienced by anyone learning a new body of knowledge is caused by the need to master an often esoteric vocabulary; indeed, without a knowledge of basic terms and concepts, it is often impossible even to ask intelligent questions. At this point, it is enough to be told what things are on the most rudimentary level; sometimes only hearing the words is enough to begin to feel familiar. Certainly, it is useful also to be provided with information on where to go to find out more, if the student would like to do so. The goal is to help the new user become self-reliant.

Since the diskette is the most common storage medium that the student is likely to be using, an explanation of its parts and operation is very useful, as well as tips on its care and handling. Since students always wonder how much abuse a diskette can really take, a diskette can be bent, stepped on, and otherwise damaged as a graphic demonstration.

Part of the introductory module should be devoted to an overview of software, the kinds and uses of operating systems, compilers, word processors, spread sheets, expert systems, communications packages, authoring systems, statistical packages, etc., always with an emphasis on helping the student understand how things are alike, and how they differ, in an effort to begin to build an organized body of knowledge.

Basic ideas and information could also be covered, since knowing the words and what they mean is such a large part of mastering any new body of knowledge. The distinction between memory and storage, input and output, RAM and ROM, BITS and BYTES, etc., could be covered. Sstudents need to be told about computer chips, binary arithmetic, machine language, programming, compiling, artificial intelligence, communications, etc.

Finally, is is useful to cover basic MS-DOS commands, since this operating system will probably continue to be widely used for some time to come. Students would profit by knowing about such things as formatting, installing the system, renaming files, changing drives, copying files, etc.

2.1.1.2 The Closing Module

At the end of the semester, there should be a CLOSING module, again to be taken by all students. This module could raise questions concerning the ethics of computer use: issues of privacy, copyright, compensation, etc. There should be some attention given to the social impact of computers: life in an 'information age'; privacy; acquisition, control, and manipulation of data; potential for benefit and harm; change in daily life and in the workplace; prospects for AI research; religious and moral effects; implications for other cultures and applications.

2.1.1.3 Other Basic Modules

Between the opening and closing modules, students would take basic modules devoted to various aspects of computer use. These modules should be of some standard length (two to three weeks long, for example), and there should be several from which the the student might choose, so that individual self-direction would be allowed.

Such modules might include an overview of text processors, followed by an introduction to the use of some easily-learned processor; a further introduction to MS-DOS, or to some other operating system; an overview of programming languages, followed by a brief introduction to writing simple programs; an introduction to the use of a database manager or a spread sheet, etc. In each case, the student should be told enough to begin using the application for simple tasks, but not enough to become overwhelmed. The goal should always be to de-mystify the machine, and help the user to become comfortable and ready for further learning outside the framework of the computer literacy course.

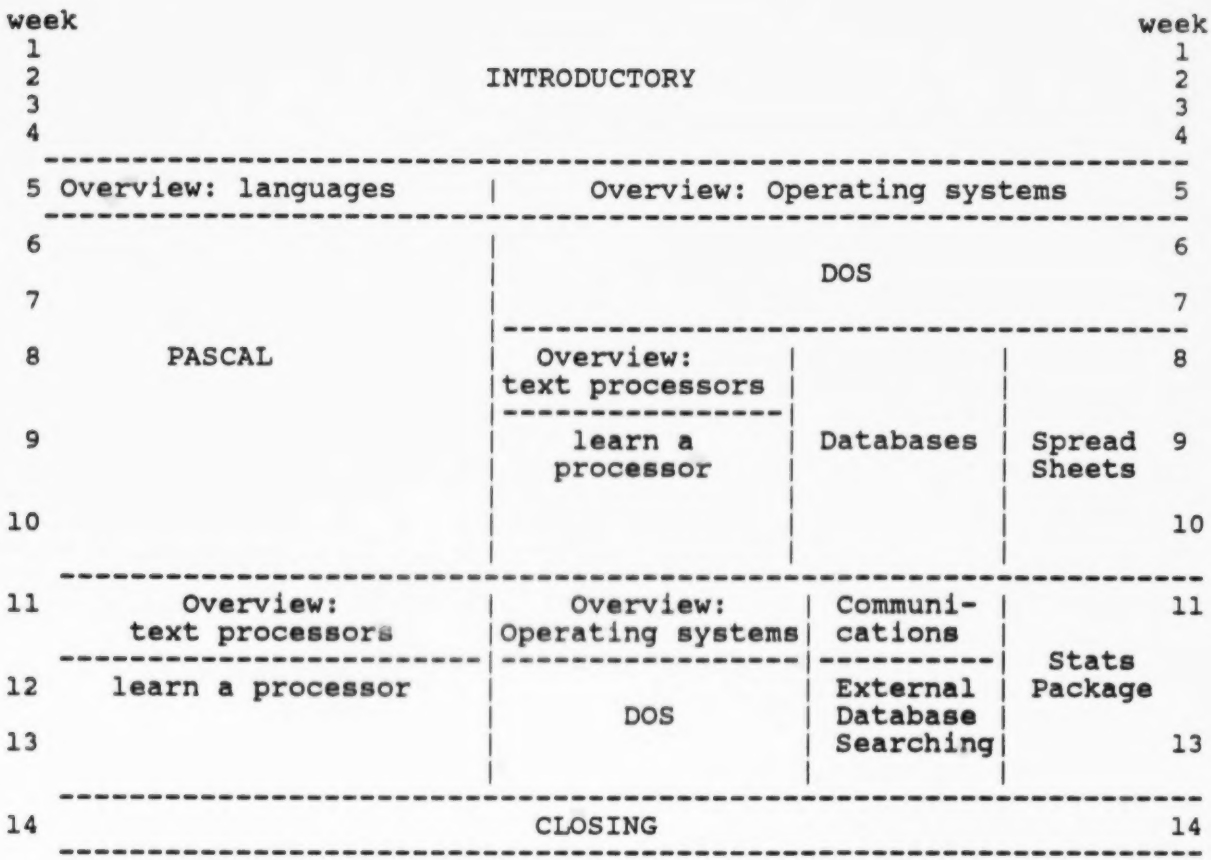
2.1.1.4. Tying the Modules Together

In order to establish and preserve the contunuity between modules, a good introductory text should be used. This text should be easy to read, and comprehensive enough to cover a variety of topics. Possibly the best such text is Tannenbaum's *Computing in the Humanities and Social Sciences* (Computer Science Press, 1988. ISBN 0-88175-174-X). There are other texts, of course, many of which are accompanied by software, or are designed to be used with student versions of popular packages.

Another good strategy would be for students to be provided with an integrated package, such as *Framework* or *Lotus 1-2-3* or the like. Such a package would prove useful in a number of modules; are often abailable by site-license, or in less expensive student versions; and are well-documented and well-supported by secondary texts.

2.1.1.5. Possible Schedule of Modules

As an illustration of the approach, below is a possible schedule for the beginning course. Everyone will take the introductory module, which will last four weeks. At the end of week 4, the student will have the option of taking either the overview of languages, or the overview of operating systems. Students who take languages will work within the language module from weeks 6 until 10. Students who take DOS will work within the DOS module until the end of week 7, at which point they may take the overview of text processors, database manipulation, or spread sheets. And so on.



2.1.2 Advanced Modules

After being introduced to computers and their uses, students should be able to take more advanced modules. These modules could be introduced by departments as needed or requested, the introducing department will designate staff to be responsible for teaching its modules, and departments will suggest paths through the modules for their majors to take. For example, students interested in artificial intelligence developments could be encouraged to take advanced modules in binary arithmetic and computer architecture, expert systems, simulations and modeling, and artificial intelligence. As departments perceive a need for a new module, those departments could design and offer that module, within the course framework.

These advanced modules could include an introduction to the use of the computer in literary studies, or to computer-based education; advanced word processing, using a processor like Nota Bene; desk-top publishing; artificial intelligence; simulations

and modeling; expert systems; binary arithmetic and computer architecture; data acquisition and computer controlling; graphics; computer-aided design; games. The list could go on and on; the point is that new users will be introduced, as painlessly as is possible, to these used, as a foundation for more advanced work in the area, either as part of a regular course, or as a self-directed user.

2.2. ADVANTAGES

There are a number of advantages to the suggested approach:

Students respond favorably to self-determination, and are more likely to enjoy the course; new modules can be easily developed, and outmoded ones easily phased out; no level of expertise is assumed, and students involved can easily 'seek their own level' as they work through the modules; the course can be a resource for university personnel; particular departments can establish modules, suggest pathways, etc.; proficiency testing allows student to 'place out', thus avoiding waste of time and boredom.

3. MEANS OF DELIVERY

Means of delivering instruction in the modules can include:

Lecture; lecture combined with recitation sections; instructional videotapes which have been created in-house; instructional videotapes which have been purchased; use of commercially available laserdisks in both a linear and an interactive fashion; use of overhead projector and overlays; use of a projector tied to PC; holding classes in a lab equipped with networked PCs; holding classes in a lab with the instructor calling out tasks to be performed; completely individual work combined with recitation classes. One advantage to the use of machine aides is that students would be able to review at any time, simply by running the tape, laserdisk, or whatever over again. Another is that many of the modules could be taught primarily by the use of machine aides, with no need for faculty to devote their time to instruction in these basic and possibly uninteresting matters.

4. IMPLEMENTATION

To facilitate the development of such a course, it would be necessary to develop a structure within the institution for the purposes of course organization and maintenance. The following should be taken into account:

1. An advisory committee should be established, which will assist in the planning and implementation of the project.

This committee could include people from both inside and outside the institution.

2. A core group of faculty, staff, and also students who have demonstrated expertise in various computer-related areas, and who are committed to computer use in education, should be selected for direct involvement in this project.

3. In conjunction with the above recommendation, it would be advantageous to appoint a director or co-ordinator who will assume responsibility for the operation of this project. This co-ordinator will report to the Dean of the College in matters of policy and administration.

4. Interested key faculty who wish to develop modules in their respective areas of study should be identified and involved.

5. Student aids and teaching assistants should assist the instructors.

6. Faculty could be compensated by overload payment and/or released-time, and student aids through work-study funds.

7. The support and advice of existing computer facility staff, as well as current instructors of computer-related courses should be sought.

8. The project should have the use of a secretary to help with the paper work and scheduling.

9. A budget line for purchase of new software and instructional materials should be established. Funds should also be sought from outside sources.

10. Facilities in support of the project must be established.